



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION I  
475 ALLENDALE ROAD  
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

July 27, 2011

Mr. Michael J. Pacilio  
Senior Vice President, Exelon Generation Company, LLC  
President and Chief Nuclear Officer (CNO), Exelon Nuclear  
4300 Winfield Road  
Warrenville, IL 60555

SUBJECT: THREE MILE ISLAND STATION, UNIT 1 – NRC INTEGRATED INSPECTION  
REPORT 5000289/2011003

Dear Mr. Pacilio:

On June 30, 2011, the U.S. Nuclear Regulatory Commission (NRC) completed an integrated inspection at your Three Mile Island, Unit 1 (TMI) facility. The enclosed inspection report documents the inspection results, which were discussed on July 15, 2011, with Mr. Rick Libra, TMI Plant Manager and other members of your staff.

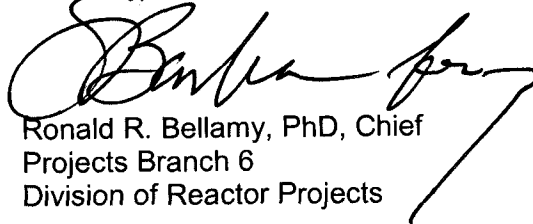
The inspection examined activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and with the conditions of your license. The inspectors reviewed selected procedures and records, observed activities, and interviewed personnel.

On the basis of the results of this inspection, no findings of significance were identified.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response (if any) will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Website at <http://www.nrc.gov/reading-rm/adams.html> (the Public Electronic Reading Room).

We appreciate your cooperation. Please contact me at 610-337-5200 if you have any questions regarding this letter.

Sincerely,

  
Ronald R. Bellamy, PhD, Chief  
Projects Branch 6  
Division of Reactor Projects

Docket No: 50-289  
License No: DPR-50

Enclosure: Inspection Report 05000289/2011003  
w/Attachment: Supplemental Information

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Sincerely,  
/RA by Scott Barber Acting For/  
Ronald R. Bellamy, PhD, Chief  
Projects Branch 6  
Division of Reactor Projects

Docket No: 50-289  
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Enclosure: Inspection Report 05000289/2011003  
w/Attachment: Supplemental Information

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION 1

Docket No: 50-289

License No: DPR-50

Report No: 05000289/2011003

Licensee: Exelon Generation Company

Facility: Three Mile Island Station, Unit 1

Location: Middletown, PA 17057

Dates: April 1 through June 30, 2011

Inspectors: D. Kern, Senior Resident Inspector, Three Mile Island  
J. Heinly, Resident Inspector, Three Mile Island  
E. Bonney, Resident Inspector, Beaver Valley Units 1 and 2  
R. Nimitz, Senior Health Physicist

Approved by: R. R. Bellamy, Chief  
Projects Branch 6  
Division of Reactor Projects (DRP)

Enclosure

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## SUMMARY OF FINDINGS

IR 05000289/2011003, 04/01/2011-06/30/2011; Exelon Generation Company, LLC; Three Mile Island, Unit 1, Integrated Inspection Report.

The report covered a three-month period of baseline inspection conducted by resident inspectors and announced inspections by regional specialist inspectors. No findings of significance were identified. The NRC's program for overseeing the safe operation of commercial nuclear power reactors is described in NUREG-1649, Reactor Oversight Process, Rev. 4, dated December 2006.

## REPORT DETAILS

### Summary of Plant Status

Three Mile Island, Unit 1 (TMI) began the inspection period at approximately 100 percent rated thermal power. On May 11, operators rapidly reduced power to 76 percent as requested by the transmission system operator due to emergent grid conditions. Reactor power was returned to 100 percent on May 12. On May 20, TMI reduced power to 50 percent to remove the 'A' cooling tower from service for pipe repairs. TMI restored power to 100 percent following the maintenance outage on May 22 and continued to operate at full power through the end of the inspection period.

### 1. REACTOR SAFETY

#### Cornerstones: Initiating Events, Mitigating Systems, Barrier Integrity

#### 1R01 Adverse Weather Protection (71111.01)

##### .1 Impending Adverse Weather - Severe Storm & Tornado Warning (1 sample)

##### a. Inspection Scope

On April 27, a severe storm approached TMI. Plant on-line maintenance risk was Yellow, due to the station blackout (SBO) diesel generator and the turbine driven emergency feed water pump (EF-P-1) both being unavailable due to planned maintenance activities. At 3:10 p.m., the National Weather Service declared a Tornado Warning and operators entered procedure OP-TM-AOP-004, Tornado / High Winds, Rev. 1. Operators and work control personnel reassessed work activities to optimize equipment availability. Station personnel expedited completion of corrective maintenance and restoration of the SBO diesel generator. The inspectors met with various station personnel to discuss the associated potential impact on offsite power availability, the river water intake pathway, emergency response organization (ERO) and plant operator/security officer relief availability. The inspectors discussed station implementation of OP-AA-108-111-1001, Severe Weather and Natural Disaster Guidelines, Rev. 5 and OP-TM-108-111-1001, TMI Site Inaccessibility Plan, Rev. 3. On April 28, at 1:54 a.m., the tornado watch was terminated. At 3:46 a.m., the National Weather Service declared a Severe Thunderstorm Warning. In accordance with WC-AA-101, On-Line Work Control Process, Rev. 18, station on-line maintenance risk was now elevated to Orange, due to the increased potential for a loss of offsite power, combined with EF-P-1 being unavailable. The inspectors performed station walkdowns, interviewed operators and security officers, and observed plant operations prior to, during, and after the storm to verify TMI operation was consistent with Technical Specifications (TS), plant procedures, and the Security Plan. The inspectors also verified that ERO capabilities were maintained in accordance with EP-AA-1009, Radiological Emergency Plan Annex for TMI Station, Rev. 16. The Severe Thunderstorm Warning was cancelled at 6:45 a.m. and station on-line maintenance risk returned to Green. Additional documents reviewed are listed in the Attachment.

##### b. Findings

No findings were identified.

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.2 Power Grid Reliability: Readiness of Offsite and Alternate AC Power Systems (1 sample)

a. Inspection Scope

The inspectors verified plant features and procedures for continued operation and reliability of the offsite power grid and onsite alternate AC power systems during adverse weather (i.e., thunderstorms and hot weather extremes). Reviews included station procedures affecting operation of onsite electrical generation sources and communication protocols between control room operators and the transmission system operator to verify appropriate information is exchanged when issues arise that could impact the offsite power system. The inspectors reviewed Issue Report (IR) 1180791, which evaluated a difference in voltage indication between the two 230KV buses that are supplied from offsite power. The condition was evaluated and determined to be only an indication anomaly with no potential adverse impact to plant equipment or reliability of any offsite power source. The inspectors interviewed station personnel, reviewed equipment maintenance and corrective action program records, and performed an in-plant and switchyard walkdown to physically verify material condition, readiness of the offsite electrical transformers, and readiness of onsite emergency diesel generators. Additional documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

.3 Dike/Flood Control System (1 sample)

a. Inspection Scope

The inspectors reviewed Exelon's external flooding mitigation strategy including applicable sections of the Updated Final Safety Analysis Report (UFSAR) and historic issue reports. The inspectors reviewed station surveillance procedure 3301-SA1, Dike Inspection, Rev. 14 which was performed by utility technicians during the week of May 23, to determine the condition of the flood barrier and whether repairs were needed. The inspectors accompanied the technicians on the walkdown of the flood protection dike to verify it was capable of performing its design function. Specifically, the inspectors verified that the dike maintained the appropriate design slope, contained no unwanted vegetation or depressions, and the flood protection valves would operate as designed. Additional documents reviewed are listed in the Attachment.

b. Findings

No findings were identified.

1R04 Equipment Alignment (71111.04)

a. Inspection Scope

Partial System Walkdowns (71111.04Q – 3 samples)

The inspectors performed three partial system walkdown samples:



- On April 28, operators removed the turbine driven emergency feedwater pump (EF-P-1) from service for planned maintenance. During the outage, the inspectors verified that the redundant train, EF-P-2A/B, was properly aligned to perform its accident mitigation function.
- On May 10, the inspectors verified that the 'A' emergency diesel generator (EG-Y-1A) was properly aligned to perform its accident mitigation function while EG-Y-1B was out of service for planned maintenance.
- On June 8, the inspectors verified that the alternate inventory supply to the emergency feedwater system was available. Specifically, the inspectors reviewed susceptibility to air voiding during realignment to the alternate inventory based upon recent industry operating experience.

The partial system walkdowns were conducted to ensure redundant trains and standby equipment relied on to remain operable for accident mitigation were properly aligned. Additional documents reviewed during this inspection are listed in the attachment.

#### Complete System Walkdown (71111.04S – 1 sample)

The inspectors conducted a detailed review of the alignment and condition of the system listed below using piping and information diagrams and evaluated open corrective action program reports for impact on system operation. In addition, the inspectors reviewed the associated protected equipment log, and interviewed the system engineer and control room operators. Additional documents reviewed are listed in the Attachment.

- On June 2, the inspectors independently performed a full system equipment alignment verification on the reactor building emergency cooling system. The walkdown included a reactor building entry to verify the appropriate alignment and condition of vent and drain valves and emergency cooling coils.

#### b. Findings

No findings were identified.

#### 1R05 Fire Protection (71111.05Q – 9 samples)

##### a. Inspection Scope

The inspectors conducted fire protection inspections for several plant fire zones which were selected based on the presence of equipment important to safety within their boundaries. The inspectors conducted plant walkdowns and verified the areas were as described in the TMI Fire Hazard Analysis Report, and that fire protection features were properly controlled per surveillance procedure 1038, Administrative Controls-Fire Protection Program, Rev. 76. The plant walkdowns were conducted throughout the inspection period and included assessment of transient combustible material control, fire detection and suppression equipment operability, and compensatory measures established for degraded fire protection equipment in accordance with procedure OP-MA-201-007, Fire Protection System Impairment Control, Rev. 6. In addition, the inspectors verified that applicable clearances between fire doors and floors met the criteria of Attachment 1 of Engineering Technical Evaluation CC-AA-309-101, Engineering Technical Evaluations, Rev. 11. Fire zones and areas inspected included:

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- Fire Zone AB-FZ-11, ESF Ventilation Building Elevation 331';
- Fire Zone AIT-FZ-1/1A, Air Intake Tunnel Elevation 281', Air Intake Tunnel;
- Fire Zone CB-FA-2G, Control Building Elevation 322', 'B' Battery Room;
- Fire Zone CB-FZ-5A, Control Building Elevation 380', North H&V Equipment Room;
- Fire Zone CB-FZ-5B, Control Building Elevation 380', South H&V Equipment Room;
- Fire Zone FH-FZ-6, Fuel Handling Building Elevation 285', Chiller Room;
- Fire Zone IB-FZ-1, Intermediate Building Elevation 295', Reactor River Valve Area;
- Fire Zone IB-FZ-6, Intermediate Building Elevation 322', General Area; and
- Fire Zone IB-FZ-7, Intermediate Building Elevation 355', General Area.

b. Findings

No findings were identified.

1R06 Flood Protection (71111.06 – 2 samples)

.1 Underground Electrical Cable Vaults

The inspectors accompanied engineers during portions of the semi-annual electrical vault inspection performed in accordance with MA-TM-153-001, Inspection and Maintenance of TMI-1 Electrical and Telephone Manholes, Rev.1. The inspectors selected electrical vaults E7N and E7S based on the risk significance of equipment powered by the cables which pass through these vaults.

The inspectors entered the vaults to verify cables and/or splices were intact, support structures provided appropriate support for the cables and cable trays, cables were not submerged in water, dewatering devices functioned properly, and to verify the as-built configuration matched associated design drawings. The inspectors also verified that degraded conditions were properly identified, documented, corrected, or entered into the corrective action program for resolution.

The inspectors reviewed the documented results of the semi-annual cable vault inspections for 17 additional underground cable vaults performed between March and June 2011. The inspectors discussed the vault inspection results with engineers and maintenance personnel to verify reasonable corrective actions were implemented where appropriate (i.e., repairs to verify installed drainage systems worked, repairs to vault access manways).

.2 Internal

a. Inspection Scope

On May 6 and May 27, the inspectors performed visual inspections of flood barriers, system boundaries, water line break sources, and floor drains located in 'A' decay heat (DH) vault where internal flooding could adversely affect safety related systems needed for safe shutdown of the plant. Operators had identified that during periods of heavy rain, rainwater penetrated the vault walls and collected on the vault floor. The inspectors determined the rate of water in-leakage was very low. Since the vault floor drain system was in service and periodically maintained, the rainwater did not pose a challenge to 'A' DH train operability. The inspectors noted a wide variety of loose material in the vault (i.e., plastic labels, tape, foreign material exclusion caps, wire, paint chips, plastic tie

wraps) which could challenge the ability of the floor drain to remove water from the room. The 'A' DH vault sump alarm remained unaffected and therefore operators would have time to respond and clear the floor drain before 'A' decay heat pump operability was affected. The licensee initiated IRs 1213417 and 1215465 to document and remove the loose debris.

b. Findings

No findings were identified.

1R11 Licensed Operator Requalification Program (71111.11Q – 1 sample)

Licensed Operator Simulator Training

a. Inspection Scope

On June 21, the inspectors observed licensed operator requalification training at the control room simulator for the 'E' operator crew. The inspectors observed the operators' simulator drill performance and compared it to the criteria listed in TMI Operational Simulator Scenario TA-TM-LRU-106-S024, Reactor Building Fire Alarm, Hi Vibrations on FW-P-1B, Rising Load on Grid, Loss of FW-P-1B, Loss of Offsite Power, Rev. 1. The inspectors reviewed the operators' ability to correctly evaluate the simulator training scenario and implement the emergency plan. The inspectors observed supervisory oversight, command and control, communication practices, and crew assignments to ensure they were consistent with normal control room activities. The inspectors observed operator response during the simulator drill transients. The inspectors evaluated training instructor effectiveness in recognizing and correcting individual and operating crew errors. The inspectors attended the post-drill critique and reviewed the written crew critique in order to evaluate the effectiveness of problem identification. The inspectors verified that emergency plan classification and notification training opportunities were tracked and evaluated for success in accordance with criteria established in Nuclear Energy Institute (NEI) 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 6. Additional documents reviewed are listed in the attachment.

b. Findings

No findings were identified.

1R12 Maintenance Effectiveness (71111.12Q – 3 samples)

a. Inspection Scope

The inspectors evaluated the listed samples for Maintenance Rule (MR) implementation by ensuring appropriate MR scoping, characterization of failed structures, systems, and components (SSCs), MR risk categorization of SSCs, SSC performance criteria or goals, and appropriateness of corrective actions. Additionally, extent-of-condition follow-up, operability, and functional failure determinations were reviewed to verify they were appropriate. The inspectors verified that the issues were addressed as required by 10 CFR 50.65, Requirements for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants; Nuclear Management and Resources Council 93-01, Industry Guideline for Monitoring the Effectiveness of Maintenance at Nuclear Power Plants, Rev. 2; and Exelon procedure ER-AA-310, Implementation of the Maintenance Rule, Rev. 8. The

inspectors verified that appropriate corrective actions were initiated and documented in IRs, and that engineers properly categorized failures as maintenance rule functional failures and maintenance preventable functional failures, when applicable.

- On May 4, operators observed that 'A' emergency diesel generator (EDG) starting air receiver pressure was much lower than normal and although the associated air compressor was running, receiver air pressure continued to slowly decrease. Mechanics replaced the unloader valve on the air compressor (EG-P-1A), but this did not correct the condition. Further troubleshooting determined that an EG-P-1A oil pressure regulator was controlling pressure too low, which by design caused EG-P-1A to run unloaded and prevented recharging the 'A' EDG air receiver (IR 1211448). The licensee equipment failure apparent cause evaluation determined the most likely cause was moisture in the air which created small corrosion products that blocked the oil pressure adjusting valve. Engineers correctly concluded EDG air bank pressure remained above the value necessary to safely start the EDG in 10 seconds and therefore the EG-P-1A failure was not a functional failure of the EDG. Licensee maintenance practices were consistent with the vendor manual. Further discussion with the vendor identified additional preventive maintenance activities, not previously recommended by the vendor, to address this failure mechanism. The licensee addressed the recommended additional preventive maintenance in their corrective action program.
- Maintenance technicians identified an elevated vibration reading on the 'B' makeup pump motor following an extended makeup pump maintenance outage that replaced the motor (IR 1169471). Although the magnitude of the vibration readings met the acceptance criteria, further technical analysis was performed to ensure adequate continued operation of the motor. Maintenance technicians reviewed the vibration frequency and acceleration data and identified no issues that would correlate to any mechanical or electrical faults. In addition, technicians performed vibration readings monthly and no discernable trend was identified. The inspectors independently reviewed the vibration data, performed a walkdown of the 'B' makeup pump motor and interviewed maintenance and engineering personnel. Additionally, the inspectors analyzed the vibration data for the 'B' makeup pump and associated gear unit.
- On May 10, the inspectors identified rain water collecting between the rubber roofing membrane and concrete structure of the auxiliary building. Furthermore, it was identified that during periods of heavy rain there was leakage through the concrete structure onto electrical cables associated with nuclear service closed cooling and decay closed cooling water motors. Operators appropriately entered the conditions into the corrective action program (IR 1214063, 1228244). Engineering and maintenance technicians walked down the auxiliary building to identify the extent-of-condition and impact on plant equipment. Corrective actions were implemented to remove the rain water from under the rubber membrane and repair it in accordance with vendor recommendations. Engineering staff performed an inspection and evaluation of the impact of the rain water leakage on plant components. The inspectors reviewed the assessment and repair activities on the roofing membrane and independently assessed the condition of the components affected in the auxiliary building. Additionally, the inspectors reviewed the structural monitoring inspection program for the auxiliary building and assessed the previous characterization of issues identified. The inspectors reviewed the maintenance rule

assessments and corrective actions for this condition and did not identify any deficiencies.

b. Findings

No findings were identified.

1R13 Maintenance Risk Assessments and Emergent Work Control (71111.13 – 6 samples)

a. Inspection Scope

The inspectors reviewed the scheduling, control, and equipment restoration during maintenance activities to evaluate their effect on plant risk. This review was against criteria contained in Exelon Administrative Procedure 1082.1, TMI Risk Management Program, Rev. 8 and WC-AA-101, On-Line Work Control Process, Rev. 18.

- On April 25, nuclear river pump 'C' was removed from service for planned maintenance which resulted in a Yellow station risk condition. The inspectors reviewed and independently assessed the licensee's compensatory actions associated with the elevated risk condition.
- On April 28, the turbine driven emergency feedwater pump (EF-P-1) and the station blackout diesel generator (EG-Y-4) were out of service for planned maintenance resulting in a Yellow risk condition. Subsequently, an Orange risk condition was entered due to the presence of severe thunderstorms. Operators took prompt actions to return EG-Y-4 to service. The inspectors reviewed and independently assessed the operator actions to address the unplanned entry into an Orange risk condition.
- On May 1, operators removed instrument air compressor 4, IA-P-4, from service for a planned maintenance outage. In addition, motor operated valve testing was conducted on make-up system injection valves, MU-V-16A/B. The station entered a Yellow risk condition based upon the plant configuration. The inspectors verified that the risk assessment accurately captured the testing performed on the MU-V-16A/B. The inspectors concluded that a Yellow risk condition was appropriate for the plant configuration.
- On May 4, an unplanned entry into a Yellow risk condition occurred due to an emergent failure of the 'A' emergency diesel generator air start compressor. The inspectors verified that appropriate compensatory actions were taken to mitigate the unplanned elevated risk condition.
- On May 6, technicians performed air operated valve actuator diagnostic testing on the 'A' DH removal heat exchanger component cooling water inlet valve (DC-V-2A). The automatic safety actuation of this valve was unavailable during this testing. Inoperability of the 'A' DH train would generate an Orange online maintenance risk condition. Station personnel implemented compensatory measures, including a dedicated operator with written instructions, for promptly restoring remote operation of the DC-V-2A. This enabled the licensee to consider the 'A' DH train available during the testing. The inspectors verified appropriate controls were implemented and maintained to support crediting manual operator action for 'A' DH train operability. Accordingly, online maintenance risk remained Green.

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- On May 17, divers performed desilting operations in the intake structure which required the breaker to 'A' decay river pump, DR-P-1A, to be placed in the racked out position. Orange risk condition was not entered due to auxiliary operators being staged locally with written instructions to perform manual actions to rack in the breaker of DR-P-1A, if needed. The inspectors observed the operators briefing, reviewed the written work instructions, and interviewed the operators to verify the written instructions could be performed and within the design basis time requirement. Accordingly, online maintenance risk remained Green.

b. Findings

No findings were identified.

1R15 Operability Evaluations (71111.15 – 7 samples)

a. Inspection Scope

The inspectors verified the selected degraded conditions were properly characterized, operability of the affected systems was properly evaluated in relation to TS requirements, applicable extent-of-condition reviews were performed, and no unrecognized increase in plant risk resulted from the equipment issues. The inspectors referenced NRC Inspection Manual Chapter Part 9900, Operability Determinations & Functionality Assessments for Resolutions of Degraded or Nonconforming Conditions Adverse to Quality or Safety, Exelon procedure OP-AA-108-115, Operability Determinations, Rev. 10, and OP-AA-108-115-1002, Supplemental Consideration for On-Shift Immediate Operability Determinations, Rev. 2 to determine acceptability of the operability evaluations. Additional documents reviewed during this inspection are listed in the attachment.

- In late March, the inspectors identified two large aluminum I-beam segments, temporarily installed with clamps above safety related components FW-V-16A and FW-V-17A on the 322' elevation of the turbine building (IR 1196247). Although several C-clamps held the I-beams in place, the inspectors questioned whether the beams could reposition and damage the safety related valves during a seismic event. Engineers determined the I-beams were originally installed to support lifting and performing periodic maintenance on FW-V-16A and FW-V-17A during a plant outage. The temporary rigging beams were inadvertently left in place after the last refueling outage. Engineers performed Technical Evaluation A2182143-01, Aluminum Rigging I-Beam Load Capacity and Evaluation, to address the inspectors' concerns, and concluded it was safe to leave the beams in place until the next refueling outage.
- On April 8, station engineering documented corrosion on the building spray pump, BS-P-1B, support base (IR 1199943). The initial assessment supported operability based upon adequate pump performance and vibration data and confirmed no apparent structural weakness was present. In addition, non-destructive testing was performed along the base plate support to determine the extent of the corrosion. The testing identified slight material loss had occurred, however, adequate design margin was maintained to support pump operation during a seismic event.

- On April 30, technicians performed engineered safeguards actuation system (ESAS) logic testing and ESAS relay inspections. The relays were inspected to verify full drop-out was achieved as an extent of condition review for a previous relay failure attributed to incomplete drop-out (IR 1152443). Several (23) relays were identified to exhibit an incomplete drop-out condition, which was indicative of relay degradation due to oxidation of the relay contacts. The inspectors interviewed the system engineers, reviewed vendor manuals, maintenance/testing history and operating experience to verify the significance of incomplete drop-out and oxidation on relay operation. The inspectors concluded that the relays were capable of performing their safety function and remained operable. Furthermore, the condition was entered into the corrective action program and corrective actions were scheduled including replacement of the affected relays. The inspectors reviewed the scheduled replacement dates for the relays and concluded that the corrective actions were scheduled commensurate with the safety significance.
- The inspectors verified the continued operability of aging power supplies in the reactor protection system (RPS) and heat sink protection system (HSPS). Specifically, the inspectors reviewed recent operating experience regarding licensee operation with power supplies exceeding the vendor recommended life expectancy in RPS. The inspectors verified that the issue had been entered into the corrective action program (IR 1115086) and that appropriate preventive maintenance (PM) work orders were planned or performed to inspect, test, and replace any susceptible power supplies. The inspectors independently verified appropriate PMs were scheduled or have been performed for both HSPS and RPS.
- On May 13, emergency feedwater valve, EF-V-30D, was removed from service for planned maintenance on the air operated actuator. The planned maintenance, in part, included the replacement of four cap screws connecting the diaphragm base to the actuator frame (R2094292). Engineering requested the replacement in response to operating experience of identical cap screws experiencing fatigue failure (IR 699990) and subsequent valve failure. The replacement of the cap screws was not completed during the maintenance outage. TMI engineering engaged the manufacturer and received a failure analysis of the cap screws that concluded the cap screws would withstand 6000 cycles under the most conservative conditions. The inspectors reviewed the assumptions, inputs and conclusions of the failure analysis as well as the extent-of-condition review to verify the condition of EF-V-30D actuator and similar inservice valve actuators. Also, the inspectors verified that even under heavy loading, EF-V-30D actuator maintains a life of 60 years and fatigue failure is not expected in any cap screw. The inspectors concluded that continued operability of EF-V-30D was maintained.
- On June 17, nuclear river water pump (NR-P-1C) failed its quarterly inservice test (IST) due to low flow (IR 1230188). Station personnel developed a troubleshooting plan and retested the pump in several configurations. The measured pump flow rate met acceptance criteria. Engineers performed IST evaluation 219 and determined that the initial low flow indication was inaccurate due to not properly aligning the annubar flow measurement instrument when it was installed for the test. On retests, NR-P-1C met acceptance flow criteria. Operators determined the pump was operable and would continue to be tested on an increased frequency due to low margin above the acceptance criteria.

room temperature signal (e.g. fire). AH-D-43A and 44A are designed to isolate during a CO<sub>2</sub> actuation for a fire in the relay room and allow the carbon dioxide system (CARDOX) to perform its safety function. Engineering analysis determined that fire dampers FD-21 and FD-22 would actuate and provide an adequate relay room isolation boundary. The relay room CARDOX fire suppression system remained operable. The inspectors reviewed the engineering analysis and ventilation calculations to validate that the CARDOX system remained operable. In addition, the inspectors walked down the ventilation boundaries identified in the analysis to ensure the calculations represented actual plant conditions.

b. Findings

No findings were identified.

1R18 Plant Modifications (71111.18 – 1 sample)

a. Inspection Scope

The inspectors reviewed the following plant modification to determine whether they were designed and/or implemented as required by Exelon documents CC-AA-102, Design Input and Configuration Change Impact Screening, Rev. 20 and CC-AA-103, Configuration Change Control, Rev. 21. The inspectors verified the modification supported plant operation as described in the UFSAR and complied with TS requirements. The inspectors reviewed the function of the changed components, the change description and scope, and the 10 CFR 50.59 screening evaluation.

- Engineering Change Request (ECR) TM 11-201, AH-P-3A Discharge Pipe Re-Alignment, Rev. 0 was a permanent plant modification that reconfigured the piping supports for the 'A' control building chilled water system. On April 2, technicians identified a leak from the interface of the chilled water piping and an expansion joint, AH-XJ-41A. Troubleshooting identified that the interface between expansion joint and the pipe was misaligned. Maintenance technicians reconfigured the piping supports to realign the pipe with the expansion joint and eliminate the leakage. The inspectors walked down the modification and interviewed maintenance technicians and design engineers to verify the modification was installed in accordance with ECR 11-201. Also, the inspectors validated that the appropriate calculations for pipe stress were revised due to the manipulation of the piping supports.

b. Findings

No findings were identified.

1R19 Post Maintenance Testing (71111.19 – 6 samples)

a. Inspection Scope

The inspectors reviewed and/or observed the following post maintenance testing (PMT) activities to ensure (1) the PMT was appropriate for the scope of the maintenance work completed (2) the acceptance criteria were clear and demonstrated operability of the component and (3) the PMT was performed in accordance with procedures.



- On April 27, operators performed 1107-9, SBO Diesel Generator, Rev. 64A following a planned maintenance outage of the station blackout diesel. Specifically, the outage involved the replacement of a K-1 relay used to flash the field of the generator (WO R2176834).
- On April 28, operators performed OP-TM-424-203, IST of EF-P-1 and Valves, Rev. 9, following a planned maintenance outage of the turbine driven emergency feedwater pump (WO R2077734).
- On May 1, operators performed 1107-3, Diesel Generator, Rev. 130, following a planned maintenance outage of the 'A' emergency diesel generator to blow down fuel oil drain lines and perform preventive maintenance (WO R2180365).
- On May 5, operators performed 1104-25, Instrument and Control Air System, Rev. 144, following a planned outage of the instrument air compressor (IA-P-4) for an overhaul of the motor (WO R2171413).
- On June 13, operators performed 1303-4.16, Emergency Power System, Rev. 127, following an extended planned maintenance overhaul outage of the 'B' emergency diesel generator (WO R2174164).
- On June 22, operators tested the control building emergency ventilation fans, AH-E-17B, 18B, and 19B in accordance with 1104-19, Control Building Ventilation System, Rev. 77, following planned preventive maintenance (WO R2058226).

b. Findings

No findings were identified.

1R22 Surveillance Testing (71111.22 – 3 samples)

a. Inspection Scope (1 inservice testing samples and 2 routine surveillance samples)

The inspectors observed and/or reviewed the following operational surveillance tests in accordance with Exelon procedure WC-TM-430 Surveillance Testing Program, Rev. 0 and WC-TM-430-1001 Surveillance Testing Program Database Interface and Maintenance, Rev. 1. Inspection activities included review of previous surveillance history to identify problems and trends, observation of pre-evolution briefings, and initiation/resolution of related IRs for selected surveillances.

- On May 9, technicians calibrated the 'A' core flood tank level instrumentation in accordance with 1302-5.15A.4, CF2-LT2 Level Channel Calibration, Rev. 0 (IRs 1213553, 1213637, 1215829);
- On May 14, technicians performed OP-TM-543-202, Inservice Test of DC-P-1B, Rev. 2; and
- On May 19, technicians performed 1303-11.37B, Heat Sink Protection System – Once Through Steam Generator Level and Pressure Channel II Tests, Rev. 29.

c. Findings

No findings were identified.

**2. RADIATION SAFETY**

**Cornerstone: Occupational Radiation Safety**

2RS1 Access Control to Radiologically Significant Areas (71124.01)

a. Inspection Scope

The inspectors reviewed selected activities and associated documentation. The evaluation of Exelon's performance was against criteria contained in 10 CFR 20, TSs, and station procedures.

Inspection Planning

The inspectors reviewed Performance Indicators (PIs) for the Occupational Exposure Cornerstone. The inspectors also reviewed the results of recent radiation protection program audits and assessments and any reports of operational occurrences related to occupational radiation safety since the last inspection.

Radiological Hazard Assessment

The inspectors discussed plant operations to identify any significant new radiological hazard for onsite workers or members of the public. The inspectors assessed the potential impact of the changes (e.g., fuel integrity status) and the implementation of periodic monitoring to detect and quantify the radiological hazard.

The inspectors toured various radiological controlled areas and reviewed radiological surveys from the auxiliary building, spent fuel pool, and containment access areas to verify the thoroughness and frequency of surveys were appropriate for the given radiological hazard. The inspectors toured onsite radioactive material and radioactive waste storage areas to assess adequacy and implementation of radiological controls. The inspectors made independent radiation measurements to verify conditions.

Instructions to Workers

The inspectors toured the radiological controlled areas and reviewed the labeling of radioactive material containers.

Contamination and Radioactive Material Controls

The inspectors selectively observed and inspected the methods used for control, survey, and release of potentially contaminated material from the radiological controlled area. The inspectors observed technicians surveying and releasing material for unrestricted use to verify procedure compliance and assess the adequacy of the procedures to prevent unintended release of radioactive materials. The inspectors selectively verified radiation monitoring instrumentation had appropriate sensitivity for the type(s) of radiation present.

The inspectors selected two sealed sources from the licensee's inventory records that present the greatest radiological risk. The inspectors verified that the sources were accounted for and their integrity was maintained.

The inspectors verified that any transactions involving nationally tracked sources were reported in accordance with 10 CFR 20.2207. The inspectors verified the licensee submitted its source reconciliation report.

b. Findings

No findings were identified.

**Cornerstone: Occupational and Public Radiation Safety**

2RS5 Radiation Monitoring Instrumentation (71122.05)

a. Inspection Scope

Inspection Planning

The inspectors reviewed the UFSAR to identify radiation instruments designed to monitor radiological conditions in the air, process streams, effluents, materials/articles, and plant employees. The inspectors identified instrumentation and associated technical specification requirements for post-accident monitoring instrumentation.

The inspectors obtained copies of Exelon and third-party evaluation reports of the radiation monitoring program, including audits of the offsite calibration facility. The inspectors reviewed the reports for insights into the licensee's program and to aid in selecting areas for review.

The inspectors reviewed effluent monitor alarm set-point bases and the calculation methods provided in the Offsite Dose Calculation Manual (ODCM).

Walk-downs and Observations

The inspectors walked down three effluent radiation monitoring systems (station vent, reactor building purge, and fuel handling building) and one liquid system (turbine building sump). The inspectors focused on flow measurement devices and all accessible point-of-discharge liquid and gaseous effluent monitors of the selected systems. The inspectors selectively verified that effluent and process monitor configurations aligned with ODCM descriptions.

The inspectors selected various portable survey instruments in use or available for issuance. The inspectors checked calibration source check stickers for currency, assessed instrument material condition and reviewed instrument data sheets, as applicable.

Calibration and Testing Program

- Process and Effluent Monitors

The inspectors verified that channel calibration and functional tests were performed consistent with radiological effluent technical specifications (RETS)/ODCM. The inspectors verified that primary calibration adequately represented the plant nuclide mix, the secondary calibration verified the primary calibration, and the channel calibrations encompassed the instruments' alarm set-points. The inspectors focused on point of discharge effluent monitors.

The inspectors verified that effluent monitor alarm set-points were established as provided in the ODCM and station procedures.

The inspectors evaluated changes to effluent monitor set-points, to ensure that an adequate justification exists.

- Laboratory Instrumentation

The inspectors reviewed calibration of laboratory analytical instruments used for radiological analyses (e.g., gross alpha, gross beta, proportional counters, gamma spectroscopy (including germanium-lithium, high purity-intrinsic germanium) and liquid scintillation counters). The inspectors verified that daily performance checks and calibration data indicated that the frequency of calibration was adequate and there were no indications of degraded instrument performance.

- Post-accident Monitoring Instrumentation

The inspectors reviewed the calibration documentation since the last inspection on the containment high-range monitors. The inspectors verified that an electronic calibration was completed for all range decades above 10 rem/hour and that at least one decade at or below 10 rem/hour was calibrated using an appropriate radiation source. The inspectors verified the calibration acceptance criteria were reasonable, accounting for the large measuring range and the design of the instruments.

The inspectors selected high-range effluent monitors that operators would use during implementation of the emergency operating procedures as a basis for triggering emergency action levels and subsequent emergency classifications, or to make protective action recommendations during an accident. The inspectors evaluated the calibration and availability of these instruments.

- Calibration and Check Sources

The inspectors reviewed the licensee's 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," source term to determine if the calibration sources used were representative of the types and energies of radiation encountered in the plant.

b. Findings

No findings were identified.

## Cornerstone: Public Radiation Safety

### 2RS6 Radioactive Gaseous and Liquid Effluent Treatment (71124.06 – 1 sample)

#### a. Inspection Scope

##### ODCM and UFSAR Reviews

The inspectors reviewed UFSAR descriptions of the radioactive effluent monitoring systems, treatment systems, and effluent flow paths so they could be verified during inspection walk-downs.

The inspectors reviewed changes to the ODCM made by the licensee since the last inspection, as applicable. The inspectors reviewed changes against the guidance in NUREG-1301 and 0133, and Regulatory Guides 1.109, 1.21 and 4.1. The inspectors reviewed the technical basis or evaluations of any changes during the onsite inspection.

The inspectors determined if the licensee had identified, since the last inspection, any non-radioactive systems (e.g., sewage) that have become contaminated since the last inspection. The inspectors reviewed 10 CFR 50.59 evaluations that have been performed for systems that have been identified as contaminated since the last inspection. The inspectors determined if any newly contaminated systems had an unmonitored effluent discharge path to the environment, whether any required ODCM revisions were made to incorporate these new pathways and whether the associated effluents were reported in accordance with Regulatory Guide 1.21.

##### Procedures, Special Reports and Other Documents

The inspectors reviewed and discussed event reports and/or special reports related to the effluent program issued since the previous inspection to identify any additional focus areas.

The inspectors reviewed effluent program implementing procedures, particularly those associated with effluent sampling, effluent monitor set-point determinations, and dose calculations.

The inspectors reviewed self assessments and third party evaluation reports of the effluent monitoring program since the last inspection. The inspectors reviewed the reports for insights into the licensee's program and to aid in selecting areas for review. The inspectors reviewed licensee check-in assessments and quality assurance audits.

##### Walk-downs and Observations

The inspectors walked down selected accessible components of the gaseous and liquid discharge systems to verify equipment configuration and flow paths and to assess equipment material condition. The inspectors evaluated the material condition of the station vent, reactor building purge sampling systems, and turbine building sump in concert with observing sample collections.

The inspectors walked down the reactor building purge and auxiliary/fuel handling building ventilation filter trains. The inspectors visually inspected the trains to verify that there were no apparent conditions that would impact the performance or the effluent monitoring capability of the system.

The inspectors observed gaseous effluent sample collections and analysis for the station vent and the reactor building purge. The inspectors observed collection of a turbine building sump composite liquid sample.

The inspectors discussed, for liquid waste processing, the routine processing and discharge of effluents (including sample collection and analysis). The inspectors discussed effluent treatment equipment used to determine if radioactive liquid waste was being processed and discharged in accordance with procedure requirements and aligns with discharge permits (e.g., release rates). The inspectors reviewed any significant changes to its effluent release points (e.g., changes subject to a 10 CFR 50.59 review or require NRC approval of alternate discharge points).

### Sampling and Analyses

The inspectors discussed the licensee's effluent sampling activities and efforts to ensure collection of representative samples. The inspectors selected two gaseous and one liquid effluent sampling activities (station vent, reactor building purge, and turbine building sump effluent sampling) and verified that adequate controls were implemented to ensure representative samples.

The inspectors validated discharges made with inoperable effluent radiation monitors had appropriate controls in place and compensatory sampling performed in accordance with the RETS/ODCM and that the controls were adequate to prevent the release of unmonitored liquid and gaseous effluents.

The inspectors selectively reviewed the results of both the inter- and intra-laboratory comparison program to verify the quality of the radioactive effluent sample analyses. The inspectors verified that the inter laboratory comparison program include hard-to-detect isotopes as appropriate.

### Instruments and Equipment

#### - Effluent Flow Measuring Instruments

The inspectors reviewed the methodology to determine the effluent stack and vent flow rates. The inspectors verified that the flow rates were consistent with RETS/ODCM or UFSAR values, and that differences between assumed and actual stack and vent flow rates did not affect the results of the projected public doses.

#### - Air Cleaning Systems

The inspectors verified surveillance test results (auxiliary building, fuel handling building) since the previous inspection for ventilation effluent discharge systems (high-efficiency particulate air and charcoal filtration).

### Dose Calculations

The inspectors evaluated changes in reported dose values compared to the previous Radiological Effluent Release Report to evaluate the factors which may have resulted in the change.

The inspectors selectively reviewed three radioactive liquid and gas waste discharge permits to verify that the projected doses to members of the public were accurate and based on representative samples of the discharge path.

The inspectors selectively evaluated the methods used to determine the isotopes that were included in the source term to ensure all applicable radionuclides were included, within detectability standards. The inspectors reviewed the current Part 61 analyses to ensure hard-to-detect radionuclides were included in the source term.

The inspectors reviewed changes in the ODCM dose calculations since the last inspection to verify the changes were consistent with the ODCM and Regulatory Guide 1.109. The inspectors selectively reviewed meteorological dispersion and deposition factors used in the ODCM and effluent dose calculations to ensure appropriate factors were being used for public dose calculations.

The inspectors reviewed the latest Land Use Census to verify that changes (e.g., significant increases or decreases to population in the plant environs, changes in critical exposure pathways, the location of the public or critical receptor, etc.) have been factored into the dose calculations. The inspectors evaluated public dose projections to verify that the calculated doses (monthly, quarterly, and annual dose) were within 10 CFR Part 50, Appendix I and TS dose criteria.

The inspectors selectively reviewed any abnormal gaseous or liquid tank discharges (e.g., discharges resulting from misaligned valves, valve leak-by) and evaluated the releases in accordance with 10 CFR 20.1501.

#### GPI Implementation

The inspectors verified that the licensee continued to implement the voluntary NEI/Industry Groundwater Protection Initiative (GPI).

The inspectors selectively reviewed identified leakage, spill events and subsequent entries made into 10 CFR 50.75 (g) records to review any remediation action. The inspectors reviewed onsite contamination events involving contamination of groundwater. The inspectors assessed whether the source of the leak or spill was identified and mitigated.

The inspectors assessed whether sufficient radiological surveys were performed to evaluate the extent of the contamination and the radiological source term. The inspectors verified that a survey/evaluation was performed to include consideration of hard-to-detect radionuclides.

The inspectors verified that on-site groundwater sample results and a description of any significant on-site leaks/spills into groundwater for each calendar year were documented in the Annual Radiological Environmental Operating Report for the Radiological Environmental Monitoring Program (REMP) or the Annual Radiological Effluent Release Report for the RETS.

#### b. Findings

No findings were identified.

#### 2RS7 Radiological Environmental Monitoring Program (REMP)

##### a. Inspection Scope (71124.07 - 1 sample)

##### Inspection Planning

The inspectors selectively reviewed the annual radiological environmental and effluent operating reports (2009, 2010) and the results of licensee assessments since the last inspection, to verify that the REMP was implemented in accordance with the TS and ODCM. The inspectors reviewed the report for changes to the ODCM with respect to environmental monitoring, commitments in terms of sampling locations, monitoring and measurement frequencies, land use census, inter-laboratory comparison program, and analysis of data.

The inspectors reviewed the annual effluent release report and the 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste," report, to determine if the licensee was sampling, as appropriate, for the predominant and dose-causing radionuclides likely to be released in effluents.

#### Site Inspection

The inspectors walked down and observed sample collection for three air sampling stations (F1-3, G2-1, H3-1), four thermoluminescent dosimeter (TLD) monitoring stations (H1-1, F1-1, H3-1, G10-1), one drinking water station (G15-3), one surface water sample (J1-2), and one milk sampling location (G2-1) to determine whether they were located as described in the ODCM. In addition, the inspectors reviewed material conditions of monitoring equipment. Consistent with smart sampling, the inspectors selected air sampling station locations based on the locations with the highest X/Q, D/Q wind sectors, and the inspectors selected the TLDs based on the most risk-significant locations.

The inspectors observed the collection and preparation of various environmental samples from different environmental media (three particulate and iodine air monitoring stations, one drinking water location, one surface water location, and one milk sampling location). The inspectors verified that environmental sampling was representative of the release pathways as specified in the ODCM and that sampling techniques were in accordance with procedures.

For the air samplers and TLDs, the inspectors reviewed the calibration and maintenance records to verify that they demonstrate adequate operability of these components. Additionally, the inspectors reviewed calibration of the composite water samplers.

The inspectors verified that the licensee had initiated sampling of other appropriate media upon loss of a required sampling station.

Based on direct observation and review of records, the inspectors verified that the meteorological instruments were operable, calibrated, and maintained in accordance with guidance contained in the FSAR, NRC Regulatory Guide 1.23, "Meteorological Monitoring Programs for Nuclear Power Plants," and licensee procedures. The inspectors verified that the meteorological data readout and recording instruments in the control room and, if applicable, at the tower were operable. The inspectors toured the meteorological tower.

The inspectors verified that missed and or anomalous environmental samples were identified and reported in the annual environmental monitoring report. The inspectors selected events that involved a missed sample, inoperable sampler, lost TLD, or anomalous measurement, and verified that the licensee has identified the cause and implemented corrective actions. The inspectors reviewed the licensee's assessment of any positive sample results. The inspectors reviewed the associated radioactive effluent release data that was the source of the released material.

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The inspectors verified that appropriate detection sensitivities with respect to TS/ODCM were used for counting samples (i.e., the samples meet the TS/ODCM required LLDs). The inspectors reviewed quality control charts for maintaining radiation measurement instrument status and actions taken for degrading detector performance. For vendor laboratory analysis results for REMP samples, the inspectors reviewed the results of the vendor's quality control program, including the inter-laboratory comparison program, to verify the adequacy of the vendor's program.

b. Findings

No findings were identified.

2RS8 Radioactive Solid Waste Processing and Radioactive Material Handling, Storage, and Transportation

a. Inspection Scope (71124.08 - 1 sample)

Inspection Planning

The inspectors reviewed the solid radioactive waste system description in the UFSAR, the Process Control Program (PCP), and the recent radiological effluent release reports (2010) for information on the types, amounts, and processing of radioactive waste disposed.

The inspectors reviewed the scope and results of any QA audits in this area to gain insights into the licensee's performance and inform the "smart sampling" inspection planning.

Radioactive Material Storage

The inspectors toured and reviewed four areas (intermediate storage area, yard area, waste handling and processing facility, and steam generator storage building) where containers of radioactive waste were stored, to verify that the containers were labeled in accordance with 10 CFR 20.1904, "Labeling Containers," or controlled in accordance with 10 CFR 20.1905, "Exemptions to Labeling Requirements," as appropriate.

The inspectors selectively toured the facility to verify that the radioactive materials storage areas were controlled and posted in accordance with the requirements of 10 CFR Part 20, "Standards for Protection against Radiation." Areas toured included interior and exterior storage facilities (steam generator storage building, waste handling processing facility, yard areas, intermediate waste storage area, and auxiliary building.)

The inspectors selectively verified that the licensee had established a process for monitoring the impact of long-term storage (e.g., buildup of any gases produced by waste decomposition, chemical reactions, container deformation, loss of container integrity, or re-release of free-flowing water) to identify potential unmonitored, unplanned releases or nonconformance with waste disposal requirements.

Radioactive Waste System Walkdown

The inspectors selected accessible portions of the liquid and solid radioactive waste processing systems and walked down accessible portions of systems to verify that the current system configuration and operation agreed with the descriptions in the FSAR,

ODCM, and PCP. The inspectors also selectively reviewed various photographs, live camera views, and radiological surveys to assess material conditions of rooms and tanks. In addition, the inspectors selectively reviewed system "Health Reports."

The inspectors discussed radioactive waste processing and radioactive waste equipment that was not operational to determine if the equipment was abandoned in place. The inspectors discussed if the licensee had established administrative and/or physical controls (i.e., drainage and isolation of the system from other systems) to ensure that the equipment would not contribute to an unmonitored release path and/or affect operating systems or be a source of unnecessary personnel exposure. The inspectors discussed if the licensee had reviewed the safety significance of systems and equipment abandoned in place in accordance with 10 CFR 50.59.

The inspectors reviewed the adequacy of any changes made to the radioactive waste processing systems since the last inspection, to verify that changes from what is described in the FSAR were reviewed and documented in accordance with 10 CFR 50.59. The inspectors reviewed and discussed the impact, if any, on radiation doses to workers or members of the public.

The inspectors reviewed the processes for transferring radioactive waste resin and/or sludge discharges into shipping/disposal containers. The inspectors verified (for the selected processes) that the waste stream mixing, sampling procedures, and methodology for waste concentration averaging were consistent with the PCP, and provided representative samples of the waste product for the purposes of waste classification as described in 10 CFR 61.55, "Waste Classification."

The inspectors discussed and evaluated whether the tank recirculation procedure and means used provided sufficient mixing.

The inspectors reviewed the licensee's PCP to determine if it correctly described the current methods and procedures for dewatering and waste stabilization (e.g., removal of freestanding liquid).

#### Waste Characterization and Classification

The inspectors selected two radioactive waste streams to verify that the licensee's radiochemical sample analysis results were sufficient to support radioactive waste characterization as required by 10 CFR Part 61, "Licensing Requirements for Land Disposal of Radioactive Waste." The inspectors selectively verified that the licensee's use of scaling factors and calculations to account for difficult-to-measure radionuclides was technically sound and based on current 10 CFR Part 61 analyses.

The inspectors verified that, for plant waste streams, changes to plant operational parameters were being trended and monitored and were taken into account to (1) maintain the validity of the waste stream composition data between the annual or biennial sample analysis update, and (2) verify that waste shipments continue to meet the requirements of 10 CFR Part 61.

The inspectors reviewed the licensee's QA program to determine if the licensee has established and maintained an adequate QA program to ensure compliance with the waste classification and characterization requirements of 10 CFR 61.55 and 10 CFR 61.56, "Waste Characteristics."

### Shipment Preparation

The inspectors observed and selectively reviewed non-exempt shipment package (RS-11-036-1) surveys, labeling, marking, placarding, emergency instructions, disposal manifest, shipping papers for the driver, and licensee verification of shipment readiness. The inspectors verified that the appropriate package design and requirements had been met.

The inspectors observed radiation workers during conduct of radioactive waste shipment preparation for shipment (RS-11-036-1). The inspectors reviewed training documentation and determined that the shippers were knowledgeable of the shipping regulations and that shipping personnel demonstrated adequate skills to accomplish the package preparation requirements for public transport with respect to NRC Bulletin 79-19, "Packaging of Low-Level Radioactive Waste for Transport and Burial," and 49 CFR Part 172, "Hazardous Materials Table, Special Provisions, Hazardous Materials Communication, Emergency Response Information, Training Requirements, and Security Plans," Subpart H, "Training."

### Shipping Records

The inspectors reviewed six non-excepted radioactive material package shipments (RS-10-005-1, RS-10-036-1, RS-11-014-I, RS-11-013-I, RS-11-005-I, and RS-10-085-I). The inspectors verified that the shipping documents indicated the proper shipper name, emergency response information and a 24-hour contact telephone number, accurate curie content and volume of material, and appropriate waste classification, transport index, and UN number. The inspectors discussed the shipment placarding to determine if it was consistent with the information in the shipping documentation. The inspectors selectively discussed characterization of shipment contents including radionuclide calculations. The inspectors selectively confirmed, by hand calculation, radionuclide content of packages based on current 10 CFR Part 61 analyses and scaling factors.

#### b. Findings

No findings were identified.

### **4. OTHER ACTIVITIES**

#### 4OA1 Performance Indicator Verification (71151)

##### .1 Cornerstone: Barrier Integrity (1 sample)

The inspectors reviewed selected station records, corrective action program documents, calculation methods, and definitions of terms to verify NRC performance indicators (PIs) had been accurately reported as specified in NEI 99-02, Regulatory Assessment Performance Indicator Guideline, Rev. 5 and 6. The PI sample listed below was verified for the period July 2010 to June 2011.

- Reactor Coolant System Identified Leak Rate

#### b. Findings

No findings were identified.

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4OA2 Identification and Resolution of Problems (71152).1 Review of Issue Reports and Cross-References to Problem Identification and Resolution Issues Reviewed Elsewherea. Inspection Scope

The inspectors performed a daily screening of items entered into the licensee's corrective action program. This review was accomplished by reviewing a list of daily IRs, attending daily screening meetings, and accessing the licensee's computerized corrective action program database.

b. Findings

No findings were identified.

.2 Cumulative Operator-Work-Around (1 sample)Inspection Scope

The inspectors reviewed the cumulative effects of the existing operator work-arounds (OWAs), the list of operator challenges, equipment deficiencies logs, the list of operations department concerns, and the list of open main control room deficiencies and main control room tags to identify any effect on emergency operating procedure operator actions, and impact on possible initiating events and mitigating systems. The inspectors also interviewed selected operations and engineering personnel to assess their understanding of the OWAs and other listed control room deficiencies. The inspectors observed the quarterly OWA meeting to determine whether station personnel were identifying, assessing, and reviewing OWAs as specified in Exelon administrative procedure OP-AA-102-103, Operator Work-Around Program, Rev. 3.

b. Findings and Observations

No findings were identified.

.3 Semi-Annual Review to Identify Trends (1 sample)Inspection Scope

The inspectors performed a semi-annual review of site issues, to identify trends that might indicate the existence of more significant safety issues, as specified in NRC Inspection Procedure 71152, Identification and Resolution of Problems. The inspectors included in this review repetitive or closely-related issues that may have been documented by Exelon outside of the corrective action program, such as trend reports, performance indicators, major equipment problem lists, system health reports, maintenance rule assessments, and maintenance or corrective action program backlogs. The inspectors also reviewed the Exelon corrective action program database for January through June 2011, to assess issue reports written in various subject areas (equipment problems, human performance issues) as well as individual issues identified during the NRCs daily IR review (Section 4OA2.1).

b. Findings

No findings were identified. The inspectors determined that corrective actions to address configuration control performance deficiencies from the first half of 2010 and transient material control deficiencies from all of calendar year 2010 continued to be effective. The number and potential safety significance of configuration control related deficiencies identified in the first half of 2011 were notably reduced from the first half of 2010. Station personnel performed extent-of-condition reviews associated with adequacy of preventive maintenance (PM) for critical station components. This review identified several additional PMs to be developed and scheduled to support continued reliable equipment performance.

Additionally, the inspectors identified several instances for which corrective action timeliness was not commensurate with potential significance of degraded equipment conditions. Examples included leakage from the auxiliary building roof into the 305' elevation in the vicinity of safety related component cooling water pumps (IR 1214063), evaluation of BS-P-1A pedestal corrosion (IR 1199943), loose debris present in the 'A' DH vault (IRs 1213417, 1215465), degraded auxiliary building/fuel building charcoal filters since 2009, and incorrect implementation dates for new PMs for critical integrated control system components (IR 1195102). The inspectors observed that when station personnel initially evaluated the issues above, the evaluations focused on justification of operability or functionality, but did not emphasize restoration of design/operational margin. The inspectors discussed these issues with various station personnel, including station management. Station management acknowledged the issues, verified they were captured in the corrective action program, and initiated several significant station-wide actions to reemphasize worker performance fundamentals. The inspectors determined these corrective actions were appropriate and observed improved worker fundamental performance through the end of June 2011.

b. Findings and Observations

No findings were identified.

.4 Radiation Safety ( 71124.01, 71124.05, 71124.06, 71124.07, 71124.08)

a. Inspection Scope

The inspectors selectively reviewed corrective action documents to determine if identified problems were entered into the corrective action program for resolution and to evaluate Exelon's threshold for entering issues into the program. The review included a check of possible repetitive issues, such as radiation worker or radiation protection technician errors. Also selectively reviewed were recent audits and assessments, as appropriate, and corrective action program documents. Additional documents reviewed are listed in the Attachment.

The review was against the criteria contained in 10 CFR 20, TSs, and station procedures.

b. Findings

No findings were identified.

4OA3 Event Follow-up (71153 – 1 sample)a. Inspection Scope

On May 11, at 3:13 p.m., TMI operators commenced a rapid downpower to 76% rated thermal power. The transmission system operator (TSO) directed the downpower due to a fault on a 500KV offsite power line that feeds the TMI switchyard. TMI operators performed the downpower using the unit load demand controller in manual in accordance with procedure 1102-4, Power Operation, Rev. 120. The plant was stabilized at 76%. Subsequently, the 500KV line was removed from service for repairs. At 5:50 p.m., the TSO notified TMI that the 500KV line repairs were completed which allowed power escalation to 100%. TMI achieved 100% power at 9:30 p.m. on May 11.

The inspectors responded to the control room and observed the operator actions and plant response during the downpower and while stabilizing reactor power. The inspectors verified that appropriate TSs had been evaluated for the plant conditions. Furthermore, the inspectors reviewed operator logs, plant process computer data for pertinent plant parameters, interviewed station personnel, and performed plant walkdowns to verify operators responded in accordance with station procedures and that the plant responded as designed. The inspectors identified no issues of concern related to operator performance or plant performance during the power change evolution.

b. Findings

No findings were identified.

4OA5 Other Activities.1 (Closed) NRC Temporary Instruction 2515/183, "Follow-up to the Fukushima Daiichi Nuclear Station Fuel Damage Event"

The inspectors assessed the activities and actions taken by TMI personnel to assess its readiness to respond to an event similar to the Fukushima Daiichi nuclear plant fuel damage event. This included (1) an assessment of TMI's capability to mitigate conditions that may result from beyond design basis events, with a particular emphasis on strategies related to the spent fuel pool, as required by NRC Security Order Section B.5.b issued February 25, 2002, as committed to in severe accident management guidelines, and as required by 10 CFR 50.54(hh); (2) an assessment of TMI's capability to mitigate station blackout (SBO) conditions, as required by 10 CFR 50.63 and station design bases; (3) an assessment of TMI's capability to mitigate internal and external flooding events, as required by station design bases; and (4) an assessment of the thoroughness of the walkdowns and inspections of important equipment needed to mitigate fire and flood events, which were performed by TMI personnel to identify any potential loss of function of this equipment during seismic events possible for the site.

Inspection Report 05000289/2011009 (ML111310788) documented detailed results of this inspection activity.

.2 (Closed) NRC Temporary Instruction 2515/184, "Availability and Readiness Inspection of Severe Accident Management Guidelines (SAMGs)"

On May 23, 2011, the inspectors completed a review of TMI's severe accident management guidelines (SAMGs), implemented as a voluntary industry initiative in the

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1990's, to determine (1) whether the SAMGs were available and updated, (2) whether TMI had procedures and processes in place to control and update its SAMGs, (3) the nature and extent of the licensee's training of personnel on the use of SAMGs, and (4) TMI personnel's familiarity with SAMG implementation.

The results of this review were provided to the NRC task force chartered by the Executive Director for Operations to conduct a near-term evaluation of the need for agency actions following the Fukushima Daiichi fuel damage event in Japan. Plant-specific results for Three Mile Island Station were provided in an Attachment to a memorandum to the Chief, Reactor Inspection Branch, Division of Inspection and Regional Support, dated May 27, 2011 (ML111470361).

.3 (Closed) NRC Temporary Instruction 2515/179, "Verification of Licensee Responses to NRC requirements for Inventories of Materials Tracked in NSTS"

a. Inspection Scope (TI 2515/179)

During the period May 9-12, the inspectors conducted the following activities to confirm the inventories of materials possessed at TMI were appropriately reported and documented in the National Source Tracking System (NSTS) in accordance with 10 CFR 20.2207.

Inspection Planning

The inspectors retrieved and reviewed a copy of the licensee's submitted NSTS source inventory. The inspectors also reviewed reconciliation reports.

Inventory Verification

The inspectors performed a physical inventory of the sources listed on the licensee's inventory to identify each source listed on the inventory.

The inspectors verified the presence of the nationally tracked sources by conducting a radiation survey of the source shield, as possible, and discussions with personnel.

The inspectors examined the physical condition of the source containers, evaluated the effectiveness of the procedures for secure storage and handling, discussed maintenance of the device including source leak tests, and verified the posting and labeling of the source was appropriate.

The inspectors reviewed licensee records for the source (source certification documents) and compared the records with the data from the NSTS source inventory. The inspectors evaluated the effectiveness of procedures for updating the inventory records.

Determine the Location of Unaccounted-for Nationally Tracked Source(s)

The inspectors reviewed the licensee's source inventory and verified TMI has no unaccounted-for source(s).

Review of Other Administrative Information

The inspectors reviewed the administrative information contained in the NSTS inventory printout with licensee personnel to determine if all administrative information (e.g.,

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mailing address, docket number, and license number) were correct. The inspectors discussed updates/corrections to the information. The inspectors reviewed reconciliation reports.

b. Findings

No findings were identified.

4OA6 Meetings, Including Exit

Exit Meeting Summary

On May 12, May 27, and June 23, the inspectors presented the inspection results to members of TMI senior management. TMI management acknowledged the inspection results. No proprietary material was identified.

On June 7, 2011, Ronald Bellamy met with TMI Plant Manager, Rick Libra, to discuss the results of TMI-1 performance for 2010.

On July 15, 2011, the resident inspectors presented the inspection results to Mr. Glen Chick and other members of the TMI staff. The inspectors asked the licensee whether any of the material examined during the inspection should be considered proprietary. No proprietary information was identified.

ATTACHMENT: SUPPLEMENTAL INFORMATION

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**SUPPLEMENTAL INFORMATION**  
**KEY POINTS OF CONTACT**

Licensee Personnel

D. Atherholt	Manager, Regulatory Assurance
P. Bennett	Manager, Design Engineering - Mechanical
G. Chick	Site Vice President
G. Chevalier	Chemist
D. Divittore	Manager, Radiological Engineering
S. Falencki	Design Engineer
M. Fitzwater	Senior Regulatory Assurance Engineer
T. Haaf	Shift Operations Superintendant
M. Hardy	System Engineer-Flood Protection
C. Incorvati	Director, Maintenance
J. Karkoska	Manager, Site Security
M. Kersey	Risk Management Engineer
M. Krause	Component Monitoring Engineer
R. Libra	Plant Manager
R. Masoero	System Engineer-Inservice Testing Program Owner
W. McSorley	Procedures and Flood Protection
D. Neff	Manager, Emergency Preparedness
W. Noll	Site Vice President (former)
T. Orth	Manager, Chemistry
J. Piazza	Senior Manager, Design Engineering
M. Reed	System Engineer
C. Robles	System Engineer
A. Seedarsen	System Engineer
L. Weber	Chemist
S. Wilkerson	Manager, Design Engineering – Electrical and Instrumentation & Control
M. Willenbecher	Supervisor, Planning
G. Wright	Senior Work Week Manager
M. Wyatt	Manager, Training Support
D. Dyckman	Nuclear Safety Specialist
	Pennsylvania Department of Environmental Protection
	Bureau of Radiation Protection

**LIST OF ITEMS OPENED, CLOSED, AND DISCUSSED**Closed

05000289/2515/183	TI	Followup to the Fukushima Daiichi Nuclear Station Fuel Damage Event (Section 4OA5.1)
5000289/2515/184	TI	Availability and Readiness Inspection of Severe Accident Management Guidelines (Section 4OA5.2)
05000289/2515/179	TI	Verification of Licensee Responses to NRC requirements for Inventories of Materials Tracked in NSTS Section 4OA5.3)

Opened and Closed

None

## LIST OF DOCUMENTS REVIEWED

### **Section 1R01: Adverse Weather**

#### Procedures

1107-11, Grid Operations, Rev. 24

OP-AA-108-107, Switchyard Control, Rev. 2

OP-AA-108-107-1001, Station Response to Grid Capacity Conditions, Rev. 3

#### Drawings

13L, TMI 230KV, Rev. 1

#### Other

##### IRs

930400	1088859	1118277	1162550
963755	1104955	1118287	11653252
1024850	1107667	1123886	1180791
1078113	1116338	1132578	1200156

WO R2173663

### **Section 1R04: Equipment Alignment**

#### Procedures

1067, Independent Verification Program, Rev. 41

1107-3, Diesel Generator, Rev. 130

OP-TM-424-000, Emergency Feedwater System, Rev. 11

OP-TM-424-271, Standby Lineup and Flow Path Verification Check of EFW System, Rev. 7

OP-TM-424-902, EFW Alternate Inventory, Rev. 4

OP-TM-424-921, EFW From Fire Service Using FS-P-15, Rev. 3

OP-TM-534-000, Reactor Building Emergency Cooling Water System, Rev. 1

#### Drawings

302-082, Emergency Feedwater Flow Diagram, Rev. 24

302-101, Condensate Flow Diagram, Rev. 64

302-611, Reactor Building Normal and Emergency Cooling Water System, Rev. 13

#### Other

IR 1214328

### **Section 1R11: Licensed Operator Requalification**

#### Procedures

EP-AA-1009, Radiological Emergency Plan Annex for the Three Mile Island Station, Rev. 17

OP-TM-AOP-001, Fire, Rev. 8

OP-TM-AOP-020, Loss of Station Power, Rev. 13

OP-TM-AOP-041, Loss of Seal Injection, Rev. 5

OP-TM-EOP-001, Reactor Trip, Rev. 10

OP-TM-EOP-004, Lack of Primary to Secondary Heat Transfer, Rev. 7

OP-TM-EOP-010, Emergency Procedure Rules, Guides, and Graphs, Rev. 11

### **Section 1R12: Maintenance Effectiveness**

#### Procedures

ER-AA-450, Structures Monitoring, Rev. 0

ES-035T, Reference Manual for Inspection of Structures, Rev. 3  
MA-AA-716-230-1002, Vibration Analysis/Acceptance Guideline, Rev. 3  
U-1, Structural Facility Inspection, Rev. 12

Drawings

E-214-024, Reactor Aux Building – Below 331' and 329', Rev. 13  
SS-208-351, Electrical Elementary Diagrams 480V 1P-3C, Rev. 8  
S-211-001, Terminal Box T25, Rev. 0

Other

IRs 0692081, 1169471, 1190100, 1217318, 1218817, 1219598, 1226703  
TR-160, Maintenance Rule Structures In-Scope Inspection Report for Auxiliary Building and  
Heat Exchanger Vault, 7/30/2010  
WO R2037082, R2148357, R2126997

**Section 1R13: Maintenance Risk**

Procedures

1301-9.7, Intake Pump House Floor, Silt Accumulation and Inspections, Rev. 26  
HU-AA-1211, Pre-Job Briefings, Rev. 7  
OP-AA-108-117, Protected Equipment Program, Rev. 1  
OP-MA-109-101, Clearance and Tagging, Rev. 11  
OP-TM-211-212, IST of MU-V-16A and MU-V-16B, Rev. 3  
OP-TM-211-901, Emergency Injection (HPI/LPI), Rev. 5  
OP-TM-533-000, Decay Heat River System, Rev. 10  
OP-TM-732-404, Rack in 480V ES Breaker, Rev. 3  
SA-AA-129, Electrical Safety, Rev. 7  
TMI-PRA-003, Success Criteria Notebook, Rev. 0  
TR-122, HPI/Makeup & Purification, Rev. 3  
WC-AA-101, On-line Work Control Process, Rev. 18

Drawings

302-645, Decay Heat Closed Cycle Cooling Water Flow Diagram, Rev. 39  
302-661, Make-Up and Purification Flow Diagram, Rev. 59

Other

Clearance 10501475, 11500473  
IRs 1212813, 1213436, 1218707  
WOs R2074716, R2164163

**Section 1R15: Operability Evaluations**

Procedures

1104-45F, CO2 Fire Extinguishing System for 338' Elevation Relay Room, Rev. 26  
1303-12.8B, Fire Protection Instrumentation Function Test, Rev. 24  
AP-1038, Fire Protection Program, Rev. 76  
ER-AA-310-1004, Functional Failure Cause Determination Evaluation, Rev. 8  
IC-120A, Reactor Protection System Power Supply Checks, Rev. 1  
MA-TM-123-002, Joslyn Clark Relay Maintenance PMT/Inspection, Rev. 1

Drawings

209-639, Engineered Safeguard R.B. Isolation on Reactor Trip and High-High RB Pressure,  
Rev. 4

302-842, Control building an Machine Shop Ventilation Flow Diagram, Rev. 57

Other

AR A2181740

Failure of Actuator Cap Screws, SPX Process Equipment, Rev.1

IRs

681734	987521	1052816	1132004	1210415
699990	1018893	1060541	1155203	1231044
885409	1046748	1115086	1215892	

Material Evaluation of Two Socket-Head Cap Screws removed from a Copes-Vulcan, Exelon PowerLabs, 6/10/08

Material Evaluation of Two Socket-Head Cap Screws removed from a Copes-Vulcan, Exelon PowerLabs, 02/29/08

MPR Calculation for Transient Analysis of CO2 Discharge in TMI U1 Relay Room, Oct. 30, 2008

PES-S-002, Shelf Life, Rev. 6

WO R2094292

**Section IR19: Post Maintenance Testing**

Procedures

OP-TM-424-451, Water Removal From EF-P-1 Steam Lines, Rev. 4

OP-TM-864-901, SBO Diesel Generator (EG-Y-4) Operations, Rev. 10

Drawings

302-011, Main Steam Flow Diagram, Rev. 72

302-082, Emergency Feedwater Flow Diagram, Rev. 24

616-006, Schematic Station Blackout Diesel Generator, Sheet 5, Rev. 0

Other

IRs

1064102	1210180	1227820	1228439	1229700
1132187	1210463	1228282	1228582	
1209707	1212455	1228315	1229136	

WOs

C2024072	R2044943	R2115311	R2141909	R2173375
C2025113	R2052437	R2137206	R2153005	R2177067
C2025185	R2058455	R2139680	R2153642	R2180365
C2025189	R2064005	R2139701	R2153711	
C2025194	R2064965	R2139903	R2153713	
C2025543	R2070823	R2141666	R2172053	

**Section 2RS1: Access Control to Radiologically Significant Areas**

Procedures

NF-AA-390, Spent Fuel Pool Material Control, Rev. 4

RP-AA-460, Controls for High and Locked High Radiation Areas, Rev. 20

RP-AA-460-001, Control for Very High Radiation Areas, Rev. 2

RP-AA-460-002, Additional High Radiation Exposure Control, Rev. 0

RP-TM-460-1002, Access Control for Locked High Radiation Areas, Rev. 1

RP-TM-460-1003, Access to Reactor Incore Undervessel Area, Rev. 1

RP-TM-460-1007, Access to TMI 1 Reactor Building, Rev. 5

RP-TM-460-1008, Locked High Radiation Area Key Control, Rev. 2

RP-TM-460-1011, Establishment of Robust Barriers for Irradiated Fuel Movement, Rev. 0

Other

General Source Term Data

Instrument Calibration Records (SAM N0s. 714543, PCM1-710938, PCM2-714558, PM-7  
714502)

Locked High Radiation Key Inventory

Radioactive Source Records

Source Reconciliation Report and Leak Test Data

**Section 2RS2: Occupational ALARA Planning and Controls**

Other

ALARA Post-Job Reviews

General Source Term Data

Radiation Work Permits and associated ALARA plans and post-job reviews (409, 509, 534,  
601,602, 605, 609, 621)

Work In Progress Reviews

**Section 2RS5: Radiation Monitoring Instrumentation**

Procedures

1101-2.1, Radiation Monitor System Set-points

1302-3.1, RMS Calibration

1302-3.1A, Victoreen Effluent Gas Channel Calibration

1302-3.1B, RML 6 Calibration and Linearity Check

1302-3.3 WDL-FT-84, Channel Calibration

1302-3.4.B, FHB Ventilation System Effluent Flow Calibration

1302-3.4C, AH-FT-148A, 148B, 149, and 150 Flow Loops

1302-3.4D, Flow and Vacuum Calibration for TMI Atmospheric Effluent Radiation Monitors

1302-4.2.1, Post-Accident Radiation Monitors Channel Test

1302-15, High Range RMS Containment Monitor Calibration

1302-17.1A/B, RM-A-5, Gas Hi Calibration

1302-17.4, RM-L-12, Calibration

1303-4.10, RM-L-12 Interlock Test

1303-4.15, Radiation Monitoring System Operating Test Liquid Channel

1303-4.15, Radiation Monitoring System Quarterly Test-Atmospheric Channel

1303-4.15A, Radiation Monitoring System Test – Atmospheric

1303-4.15E, RM-A14, Radiation Monitor and Sample Flow Instrument Channel Test

CY-AA-110-200, Sampling

CY-AA-130-201, Radiochemistry Quality Control

CY-AA-130-320, Packard 2900TR/3100TR Liquid Scintillation Counter

CY-TM-130-9930, Operation of the Genie 2000 System

CY-TM-170-300, Offsite Dose Calculation Manual Rev. 17

EP-AA-1009, Radiological Emergency Plan Annex-TMI,

EP-EAL-0609, Criteria for Choosing Radiological Gaseous Effluent EAL Thresholds N1828,

NEI-99-01, Methodology for Development of Emergency Action levels

Quality Assurance Program for Radiological Effluent Monitoring

RP-AA-17, Radiological Instrument Program Description

RP-AA-700, Controls for Radiation Protection Instrumentation

SDBD-TI-661, Rev.6, System Design Basis Document for Radiation Monitoring Program

SR-FT-146, Channel Calibration

Other

AMS-3/4 Operational Check Data  
 Calibration Portable Instrument Source Check and Inventory  
 Contamination Monitoring Instrument Matrix  
 Counting Equipment Daily Status Log  
 Frisker Source Check Data  
 General Source Term Data  
 Instrument Smear Test Data  
 Laboratory Instrumentation Calibration Data – liquid scintillation, gamma spectroscopy  
 Technical Specification 6.8.4.b, Radioactive Effluent Program  
 Technical Specification 6.9.4, Annual Radioactive Effluent Release Report

**Section 2RS6: Radioactive Gaseous and Liquid Effluent Treatment**

Procedures

1303-11.15, Auxiliary and Fuel Handling Building Filter Efficiency Test  
 1440-F-1B, Charcoal Filter Sampling  
 CY-TM-170-301, Liquid and Gaseous Effluent Monthly Cumulative Dose Contribution and Projection, Rev. 0  
 MA-TM-154-902, Non-technical Specification Ventilation Filter Testing  
 U-36, Ventilation Filter DOP and Halide Testing

Other

Composite Sample table 3.2-1  
 EPRI Technical Report – Estimate of Carbon 14 in Nuclear Power Plant Gaseous Effluents - 2010  
 Gaseous Dose Projections  
 Monthly Dose Projections  
 NUREG 1301, Offsite Dose Calculation Manual Guidance  
 PWR C-14 Source Term Calculation

**Section 2RS7: Radiological Environmental Monitoring Program**

Procedures

CY-AA-170-000, Radioactive Effluent and Environmental Monitoring Programs, Rev. 4  
 CY-AA-170-100, Radiological Environmental Monitoring Program, Rev. 2  
 CY-AA-170-1000, Radiological Environmental Monitoring Program and Meteorological Program Implementation, Rev. 5  
 CY-AA-170-1100, Quality Assurance for Radiological Monitoring Program, Rev. 1  
 CY-AA-170-200, Radioactive Effluent Control Program, Rev. 1  
 CY-AA-170-210, Potentially Contaminated System Control Program, Rev. 0  
 CY-TM-170-300, Offsite Dose Calculation Manual, Rev. 2  
 CY-TM-170-1002, Radiological Environmental Monitoring Program TLD Program Data Review, Rev. 0  
 CY-170-2000, Annual Radioactive Effluent Release Report, Rev. 5  
 ER-TMI-06, Water Sampler Calibration Certificate  
 N1855, Sampling of Unmonitored Potential Radioactive Release Paths, Rev. 8  
 RP-AA-228, Rev.1, 10 CFR 50.75(g) and 10 CFR 72.30 Documentation Requirements

Other

10 CFR 50.75 (g) files  
 Air Sampler Orifice Calibration Certificates (2782155, 2782146, 2782153, and 2782154)  
 Annual Radiological Environmental, Effluent Release Reports- 2009, 2010

Annual Site Survey (Tree Survey-Meteorological Tower) TMI 2011  
 Audit Report 2011-009  
 Corrective Action Documents (ARs)  
 Corrective Action Plan Audit March 22, 2011  
 EN-TM-408-4160, RGPP Reference Material  
 Groundwater Well Data- 2010 (Groundwater Monitoring Report)  
 Monthly Surveillance data  
 NUPIC Audit 22937, April 28, 2011  
 Quality Assurance Confirmatory Testing of Environmental TLDs  
 RAF 10-005, Pathway Analysis, August 11, 2010  
 Regional Groundwater Discharge Schematic TMI Hydro-geologic Investigation Report,  
 September 2006  
 Teledyne Brown Environmental Service, Annual Quality Assurance Report January-December  
 2010  
 TMI 2010 Land Use Census, October 31, 2010  
 Vacuum Gauge for Pump Tests – Calibration (2743152)  
 Vacuum Gauge Calibration 274152

**Section 2RS8: Radioactive Solid Waste Processing and Radioactive Material, Handling  
 Storage, and Transportation**

Procedures

1104-28A, Evaporator Concentrate Processing, Rev. 33  
 1104-28C, Primary Resin and Pre-coat Processing, Rev. 21C  
 OP-TM-232-434, Recirculation of the Spent Resin Storage Tank, Rev. 3  
 OP-TM-232-545, Transfer of the Spent Resin Storage Tank to the Hittman Building, Rev. 1  
 RP-AA-500, Radioactive Material (RAM) Control, Rev. 14,  
 RP-AA-500-1001, Requirements for Radioactive Material Stored Outdoors, Rev. 2  
 RP-AA-601, Surveying Radioactive Material Shipments, Rev. 13  
 RP-AA-602, Packaging of Radioactive Material Shipments, Rev. 15  
 RP-AA-602-1001, Packaging of Radioactive Material/ Waste Shipments, Rev. 11  
 RP-AA-603, Inspection and Loading of Radioactive Material Shipments, Rev. 5  
 RP-AA-603-1001, Inspection and Loading of Radioactive material/ Waste Shipments, Rev. 2  
 RP-AA-605, 10 CFR 61 Program, Rev. 3  
 RP-AA-631, Dry Radioactive Waste Generation and Reduction, Rev. 1  
 RP-TM-500-1004, Outage Equipment Storage Building, Rev. 1  
 RP-TM-503-1001, Volumetric Material Control, Rev. 0  
 RW-AA-100, Process Control Program, Rev. 7

Other

NOSA Audit- TMI-10-04 and Audit template (Chemistry Radioactive Effluent and Environmental  
 Monitoring, Handling and Storage and Shipment), Rev. 4  
 Radwaste/Chemistry Checkin-1132237-02  
 RAF-10-007, Rev. 0, RAM Storage in the WHPF Yard Areas and RUBB Building IAW RP-500  
 and RP-AA-500-1001 October 1, 2010  
 RCS Trending Report – Third Quarter 2010  
 Shipment Records (RS-10-005-1, RS-10-036-1, RS-11-014-I, RS-11-013-I, RS-11-005-I, RS-10-  
 085-I)  
 TMI Radiation Protection Calc Sheet RAF 10-003 2009 DAW Waste Stream RADMAN WMG  
 Updated Results Review 06-18-10



**Section 40A2: Identification and Resolution of Problems****Procedures**

OP-AA-102-103-1001, Operator Burden and Plant Significant Decisions Impact Assessment Program, Rev. 3

WC-AA-101, On Line Work Control Process, Rev. 18

WC-AA-101-1002, On Line Scheduling Process, Rev. 11

WC-AA-106, Work Screening and Processing, Rev. 12

**Other**

Adverse Condition Monitoring and Contingency Plan Tracking Sheet, June 22, 2011

Audit NOSA –TMI-10-04, Chemistry, Radioactive Waste, Effluent, and Environmental Monitoring Audit Report 2011-009

Check-in assessment- Chemistry

Check- In Self Assessment Solid Waste Processing and RAM Storage and Transportation - 130987-02

Corrective Action Plan- NUPIC Audit

Corrective Action Plan Audit March 22, 2011

NOS-TMI-10-04, Chemistry, Radwaste, Effluent and Environmental Monitoring Audit Report, June 25, 2010

NUPIC Audit 22937, April 2011

Operators Aggregate Assessment, June 2, 2011

Teledyne Brown Environmental Service Annual 2010 Quality Assurance Report 2010

Teledyne Brown Environmental Service, Annual Quality Assurance Report January-December 2010

**IRs**

0929986	1069102	1135059	1203298	1231729
1059390	1081998	1184747	1220020	1231737
1060464	1082043	1185235	1220036	1904793
1063662	11176442	1192534	1220044	
1065814	1130987	1197352	1220063	

**Section 40A5 (TI 2515/179)****Procedures**

1301-7.2, Inventory and Leak Testing of Radioactive Sources, Rev. 28

RP-AA-500, Radioactive Material RAM Control, Rev. 14

RP-AA-800, Source Leak Test Record, Rev. 6

PR-AA-800-001, Nationally Tracked Source Program, Rev. 0

RP-TM-500-1002, Radioactive Material Transfer, Rev. 2

**Other**

2011 Inventory List of Radioactive Sources, National Source Tracking Registry (as of May 9, 2011)